



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION IX  
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MAY 3 2016

OFFICE OF THE  
REGIONAL ADMINISTRATOR

Colonel Kirk E. Gibbs  
U.S. Army Corps of Engineers  
Los Angeles District  
915 Wilshire Boulevard  
Los Angeles, CA 90017

Subject: Proposed Ray Tailings Storage Facility Draft Environmental Impact Statement (DEIS),  
Pinal County, Arizona [CEQ #20160024]

Dear Colonel Gibbs:

The U.S. Environmental Protection Agency has reviewed the above referenced Draft Environmental Impact Statement (DEIS). Our review and comments are provided pursuant to the National Environmental Policy Act, the Council on Environmental Quality's NEPA Implementation Regulations at 40 CFR 1500 - 1508, and our review authority under Section 309 of the Clean Air Act.

The DEIS evaluates alternatives for a new tailings storage facility (TSF) for Asarco LLC's Ray Mine in Pinal County, Arizona. According to the DEIS, the applicant's proposed alternative would disturb 2,574 acres in Ripsey Wash watershed, 0.3 mile upstream of the Gila River, and result in direct fill of approximately 130 acres of waters of the US (WUS) and indirect loss of an additional 4 acres of WUS. The proposed project would have direct, indirect, and cumulative impacts that have the potential for significant environmental degradation and violation of substantive environmental requirements. Potentially reasonable alternatives appear to be available, but were not evaluated in the DEIS, which lacks critical information needed to adequately inform the public and support the Corps' conclusions. Accordingly, EPA has rated the proposed project and the DEIS as "**EO-3 – Environmental Objections-Inadequate**" (see Enclosure 1: "Summary of EPA Rating Definitions and Follow-Up Action").

The *Environmental Objections* component of this rating reflects EPA's determination that the proposed project would result in long-term unmitigated and unacceptable degradation of groundwater and of surface water resources in Ripsey Wash and the Gila River. The Gila River is one of the most significant aquatic resources in Arizona, providing municipal and agricultural water supplies and innumerable in-stream benefits for fish, wildlife, and recreation. Ripsey Wash is a significantly sized, ecologically intact, direct tributary to the Gila River and this tributary provides outstanding individual and cumulative support to the chemical, physical and biological integrity of the Gila River's aquatic ecosystem. The Gila River was identified by EPA in 2005 as an aquatic resource of national importance (ARNI), and EPA has also identified Ripsey Wash as

an ARNI (see letter of today's date under separate cover, Enclosure 3). These conclusions are based on our findings that: (a) there appear to be practicable alternative sites that would be less damaging than the proposed action; (b) Asarco has not demonstrated that its proposed compensatory mitigation for the loss of 134 acres of WUS is sufficient; (c) although management of drain down solutions from the proposed TSF, as currently designed, would be needed for at least hundreds of years -- possibly in perpetuity -- no long-term management of the TSF is proposed; and (d) the only financial assurance that has been proposed (through the State of Arizona's Aquifer Protection Permit) to cover closure and post-closure costs is inadequate to prevent the project from resulting in significant and long-term degradation of groundwater and surface water quality.

We have determined that the DEIS is *Inadequate* because it lacks critical information needed to support the Corps' conclusions and enable the Corps to make an informed decision regarding approval of the Clean Water Act (CWA) Section 404 permit. Specifically: (a) the DEIS does not provide adequate information and evaluation of alternatives necessary to support a determination of compliance with the CWA Section 404(b)(1) Guidelines Part 230.10(a); (b) the DEIS provides inadequate information regarding the availability of sufficient compensatory mitigation for the project's losses of WUS; (c) inadequate information is provided to characterize site geochemistry and support the DEIS' conclusions regarding the adequacy of the TSF design and operation to protect water resources; (d) no information is provided regarding long-term post-closure management, which may be needed in perpetuity; and (e) neither the financial assurance needed to cover the costs of closure and post-closure management of the TSF nor its effectiveness to ensure protection of water resources is disclosed or discussed. In addition, based on the project's potential PM10 (particulate matter smaller than 10 microns) emissions, additional information is needed to demonstrate general conformity.

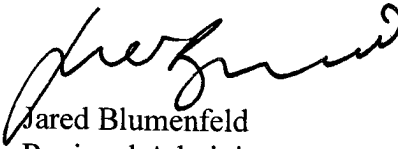
In preparing the enclosed Detailed Comments (Enclosure 2), EPA has also reviewed the Corps' Public Notice (PN) SPL-2011-01005-MWL for the proposed Ray Mine Proposed Tailings Storage Facility. A copy of our detailed comments on the PN are enclosed as Enclosure 3. EPA also reviewed numerous background documents prepared by Asarco's contractors to support the DEIS, the PN, and other permits Asarco is seeking for the proposed project, as well as the Arizona Department of Environmental Quality's (ADEQ) draft Aquifer Protection Permit No. P-511395 (APP). A copy of our detailed comments on the draft APP, submitted to ADEQ on March 4, 2016, are enclosed as Enclosure 4. In December 2014, EPA reviewed and commented on the Administrative DEIS for the proposed project. Many of our comments on that document are reiterated in our letter today because they have not been addressed.

EPA strongly recommends that additional alternatives to the proposed project, along with information regarding site geochemistry, hydrogeology, TSF design and operation, closure and post-closure, financial assurance, and mitigation, be evaluated and made available for public comment in a Revised DEIS, consistent with NEPA and CEQ's NEPA Implementation Regulations. All reasonable alternatives should be evaluated and the range of those alternatives should not be constrained by the scope of the draft APP. On the basis of the potential significant impacts involved, this project could be a candidate for referral to the CEQ in accordance with 40 CFR Part 1504. We recommend that additional information to support a more thorough alternatives analysis be provided, and that a revised mitigation plan demonstrating how the

project would fully and appropriately offset the loss of the functions and values of the affected resources be included. We also recommend that the Revised DEIS provide additional information to demonstrate conformity to the State Implementation Plan. As a cooperating agency, EPA requests the opportunity to review an administrative draft of the Revised DEIS and provide the Corps our feedback before it is published for public review and comment.

We appreciate the opportunity to review this DEIS and look forward to working with you to resolve the issues outlined in this letter. We will call to arrange a meeting with you to discuss plans for completing the NEPA process. In the meantime, if you have any questions, please call Alexis Strauss, Deputy Regional Administrator, at 415-972-3572 or have your staff contact Jeanne Geselbracht, our lead NEPA reviewer for this project, at (415) 972-3853. Please send a copy of the Revised DEIS to this office (mailcode ENF-4-2) at the same time it is filed with EPA's *e-NEPA*.

Sincerely,



Jared Blumenfeld  
Regional Administrator

Enclosures:

- (1) Summary of EPA Rating Definitions and Follow-Up Action
- (2) EPA's detailed comments on the Proposed Ray Tailings Storage Facility
- (3) EPA's April 29, 2016 3(b) letter on PN SPL-2011-01005-MWL
- (4) EPA's March 4, 2016 comments on draft Aquifer Protection Permit No. P-511395

Copy via electronic mail:

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## **SUMMARY OF EPA RATING DEFINITIONS\***

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

### **ENVIRONMENTAL IMPACT OF THE ACTION**

#### ***"LO" (Lack of Objections)***

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

#### ***"EC" (Environmental Concerns)***

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

#### ***"EO" (Environmental Objections)***

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

#### ***"EU" (Environmentally Unsatisfactory)***

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

### **ADEQUACY OF THE IMPACT STATEMENT**

#### ***Category "1" (Adequate)***

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

#### ***Category "2" (Insufficient Information)***

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

#### ***Category "3" (Inadequate)***

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

\*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

**U.S. EPA DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR  
PROPOSED RAY TAILINGS STORAGE FACILITY, PINAL COUNTY, AZ, MAY 2016**

Please note that, while the following comments specifically address the DEIS analyses and conclusions, which are focused on only the Ripsey Wash and Hackberry Gulch alternatives, our observations and recommendations here should be applied in the Revised DEIS analysis to all practicable alternatives. Please note also that our April 29, 2016 3(b) letter to you (Enclosure 3) is incorporated by reference into these comments. The “Gila River and Aquatic Resources of National Importance” and “Compliance with the Clean Water Act” sections, below, summarize the issues and recommendations raised in that letter.

**Gila River and Aquatic Resources of National Importance**

The Gila River is one of the most significant aquatic resources in Arizona, providing municipal and agricultural water supplies and innumerable in-stream benefits for fish, wildlife, and recreation. EPA identified the Gila River as an aquatic resource of national importance (ARNI) in 2005. Ripsey Wash provides outstanding individual and cumulative support to the chemical, physical and biological integrity of the Gila River’s aquatic ecosystem, the protection of which is an explicit priority of local, state, and federal agencies, environmental organizations, and the public. As a significantly sized, ecologically intact, direct tributary to the Gila River, the 134 acres of Ripsey Wash that would be eliminated by the proposed TSF also constitute ARNI. Based on the information currently available, EPA finds that the proposed discharges of dredged or fill material will have substantial and unacceptable adverse effects to ARNI.

**Compliance with the Clean Water Act (CWA)**

EPA has analyzed the proposed project for compliance with the Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Materials (40 CFR 230), promulgated pursuant to Section 404(b)(1) of the CWA (Guidelines). Asarco’s Alternative Screening and Clean Water Act 404(b)(1) Alternatives Analysis (“Alternatives Analysis”), found that the information in Appendix B of the DEIS is not adequate to support a determination of compliance with the Guidelines. Fundamental to the Guidelines is the principle that dredged or fill material should not be discharged into the aquatic ecosystem unless it can be demonstrated that there is no less environmentally damaging practicable alternative that achieves the project purpose, and that it will not cause or contribute to significant degradation of the waters of the United States.

The DEIS (p. 1-4) states, “*Asarco’s basic project purpose is mine tailings disposal, which is not water-dependent. The Project’s purpose is the development of tailings disposal capacity that will allow the full utilization of the mineral resource at the Ray Mine, using infrastructure and processes already in existence at the mine.*” According to the DEIS (p. 1-3), current mine plans for the Ray Mine anticipate milling 850 million tons over the next 50 years, based on currently identified resources and the peak production rate (maximum design capacity) of 45,000 tons per day at the existing Ray Mine Concentrator (45,000 tpd x 50 years = 821,250,000 tons). Of that 850 million tons, Elder Gulch has remaining capacity to accept approximately 100 million tons and the Hayden tailings facilities have remaining capacity to accept approximately 200 million tons. This leaves a need for approximately 550 million dry tons of new tailings storage capacity based on current projections of ore resources. Based on the DEIS and the appended Alternatives

Analysis, the overall project purpose driving Alternatives Analysis under the Guidelines should, therefore, be “to accommodate the balance of tailings from milling operations at the Ray Mine over the next 50 years, estimated at 550 million dry tons, which cannot be accommodated by the existing TSFs.”

In discussing the project purpose, the DEIS increases the capacity need by 35% for unidentified potential future mineral resources and construction of a starter dam. The DEIS states, “*In addition, a tailings facility generally requires construction of a starter dam or embankment using rock as an initial step prior to tailings deposition.*” Table 2-1 of the DEIS indicates that only 5.2 million tons of rock material are needed for the starter dam embankments; however, the DEIS goes on to state that, “*the new TSF may need to accommodate an additional roughly 200 million dry tons of material, for a total capacity of roughly 750 million tons.*” The additional 195 million tons of tailings capacity would, in effect, allow for storage to accommodate an additional 12 years of milling operations beyond the 50 years of presently identified need.

The identified mineral resources justify a 50-year scope for determining the needed capacity; therefore, potential TSF sites with significantly less than 750 million tons of capacity would meet the appropriate project purpose and may be less environmentally damaging. For example, sites with practicability challenges, such as fault or fracture zones, road realignment needs, or proximity to mineral resources may be deemed more feasible if reconfigured with smaller footprints. For these reasons, the DEIS does not rigorously explore or objectively evaluate all reasonable alternatives.

**Recommendations:** Reassess in the Revised DEIS reasonable alternatives for a TSF based on a need to accommodate the balance of tailings from milling operations at the Ray Mine over the next 50 years that cannot be accommodated by the existing TSFs. Alternatively, clearly demonstrate why the capacity to store 195 million tons more tailings than can be generated by milling at full capacity for 50 years is essential to meet the underlying need for the project.

The Alternatives Analysis identifies two sites – Ripsey Wash and Hackberry Gulch -- as practicable, and the DEIS evaluates only those sites and the No Action alternative. The DEIS and Alternatives Analysis prematurely eliminate many potentially practicable and less damaging alternatives from consideration. Smaller (550-million-ton) site alternatives, as discussed above, were not evaluated, and the West Dam and Granite Mountain sites were not carried forward for analysis.

On-site alternatives (at any location) that might have less impact to the aquatic ecosystem were also not adequately assessed. Filter or paste (dry stack) methods of tailings storage may be practicable and need a smaller footprint than a conventional wet TSF, but the DEIS does not provide adequate information to justify the elimination of a dry stack alternative in Ripsey Wash, Hackberry Gulch, or any of the other potential TSF sites. In-pit placement may also be practicable for a smaller TSF later in mine life to supplement other smaller TSF options to avoid resource impacts. Based on its known resources and reserves, Asarco should be able to identify areas of the Ray pit that may be played out a few decades from now and assess whether they could provide future in-pit storage capacity.

The proposed TSF in Ripsey Wash would disturb 134.36 acres of waters of the U.S. – 130.23 acres of direct fill and 4.13 acres of indirect disturbance from dewatering. Half of this acreage comprises large ephemeral streams that transport high volumes of water, sediment and organic matter into the Gila River. In contrast, according to the DEIS, a TSF in Hackberry Gulch would disturb 71.50 acres of waters of the U.S. – 51.70 acres of direct fill and 19.80 acres of indirect disturbance from dewatering. The Alternatives Analysis identifies the presence of 0.62 acre of wetlands within the Hackberry Gulch TSF footprint as the reason the Hackberry Gulch alternative is not the Least Environmentally Damaging Practicable Alternative (LEDPA). Inadequate information has been provided, however, to demonstrate that these wetlands plus the 70.88 acres of ephemeral waters in the Hackberry Gulch TSF footprint are of higher functional value than are the 134.36 acres of waters at Ripsey Wash. Furthermore, as noted in our comments on the Administrative DEIS, a TSF at Hackberry could be reconfigured and downsized to avoid the seeps at the far end of Hackberry Gulch adjacent to Elder Gulch. We were unable to locate a map in the DEIS identifying the Hackberry jurisdictional wetlands, or wetlands A, B, C, D or E mentioned in the DEIS (p. 3-58). If the 0.62-acre wetland is in the northwest portion of Hackberry Gulch, it may be avoidable as well, particularly if a smaller sized TSF meets the project purpose and is practicable. Substantial work to determine the LEDPA remains.

**Recommendations:** Provide more detailed information in the Revised DEIS to address the information gaps discussed above, and reassess the Ripsey Wash, Hackberry Gulch, West Dam, Granite Mountain, and Dry Stack alternatives, as well as smaller TSFs, including in-pit alternatives. Include a map that identifies all waters of the U.S. by aquatic resource type.

The Guidelines prohibit any discharge of dredged or fill material if it causes or contributes to violations of an applicable state water quality standard. Based on the information currently available, secondary impacts of the proposed fill discharges would pose substantial and unacceptable risk to surface waters that could result in violation of applicable water quality standards (including anti-degradation policies). Reductions in streamflow, alterations in sediment transport, and drainage from the TSF would degrade water quality and the aquatic ecosystem.

Impacts from the proposed project would contribute to the degradation of the Gila River by destroying miles of undisturbed upstream riparian habitat and floodplain. The proposed physical alterations to Ripsey Wash and flow bypasses may increase water velocity and dramatically alter suspended sediment loads into the Gila River, adversely affecting water quality. The proposed alternative could preclude the reduction of impairments that has been pursued through restoration projects upstream. Conservation and restoration projects on the Gila River would be hampered by increased fragmentation of the landscape and riparian corridor. Alone or in combination, the changes brought on by the proposed project would be considered significant, adverse impacts under the Guidelines.

After appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem, adequate compensatory mitigation is needed to offset losses of aquatic resources that are truly unavoidable and cannot be further minimized. Asarco

has not demonstrated that its proposed compensatory mitigation for the loss of 134 acres of waters of the U.S. is sufficient. According to the 2008 Mitigation Rule, compensatory mitigation must be, to the extent practicable, sufficient to replace lost aquatic resource functions. Asarco's "functional assessment" assigning relative value of the services provided by the Ripsey Wash is not based on any existing or approved condition or functional assessment method, and is inadequate to compare natural functions with those services provided by the proposed compensatory mitigation. Consistent with national "no net loss" goals codified in the Rule, and with the Corps' South Pacific Division standard operating procedures for setting mitigation ratios, Asarco's proposal offers insufficient "in-kind" re-establishment mitigation opportunity to offset permanent impacts to 134 acres of ephemeral streams.

As proposed, the conceptual mitigation plan for the proposed Ripsey Wash TSF is not adequate for three reasons:

1. The applicant has not established that the potential adverse impacts are unavoidable.
2. The applicant has not properly analyzed how the proposed compensatory mitigation plan replaces functions that would be lost to the proposed project.
3. The total acres proposed do not sufficiently offset total acres of aquatic resources lost.

**Recommendation:** Additional analysis of mitigation opportunities is needed prior to permit issuance to allow for the development of a fully compensatory solution. Describe in the Revised DEIS the impacts that are truly unavoidable, and document the availability of specific mitigation parcels and actions that would fully and appropriately offset the loss of the functions and acreage of the affected resources. Include a revised mitigation plan that demonstrates compliance with the South Pacific Division's mitigation guidelines. Demonstrate in the Revised DEIS that the potential impacts to water quality from TSF releases would be minimized by a commitment to adequate financial assurances.

## **Geochemistry**

Reliable, representative geochemistry information is critical to inform the EIS analysis regarding appropriate design and operation and management needs of the proposed TSF to ensure that it would be protective of groundwater and surface water resources. The geochemical testing conducted for the proposed project only addressed the Ripsey Wash site. Based on our review of the Geochemical Characterization Report<sup>1</sup> and Humidity Cell Test (HCT) Report<sup>2</sup>, the characterization of the proposed project's tailings, tailings water, and foundational and borrow materials does not appear to be consistent with current best practice, and the samples that underwent static and kinetic testing are not adequately representative of site materials. The geochemical analysis lacks critical information, as discussed below and in our more detailed comments on the Arizona Department of Environmental Quality's (ADEQ) draft Aquifer Protection Permit No. P-511395 (APP) in Enclosure 4.

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<sup>1</sup> Geochemical Characterization Report Proposed Ripsey Wash Tailings Storage Facility ASARCO Ray Operations Pinal County, Arizona (AMEC, July 10, 2014, "Geochemical Characterization Report")

<sup>2</sup> Humidity Cell Test Results (52 Weeks) Geochemical Characterization, Proposed Ripsey Wash Tailings Storage Facility, ASARCO Ray Operations ("HCT Report," AMEC Foster Wheeler, May 21, 2015)

- The ore described in the Geochemical Characterization Report represents ore to be mined for less than half of the 50-year TSF life. It is unclear how the lithology of ore mined after 2042 may differ from that represented in the HCT Report.
- The Global Acid Rock Drainage (GARD) Guide<sup>3</sup> -- a guide intended as a summary of the best practices and technology on the subject of acid rock drainage and other mining influenced water – recommends conducting kinetic tests until acidic drainage is produced or until depletion calculations can be used reliably to predict acid generation potential. Another common endpoint for kinetic testing is when leachate parameters are relatively constant with time. By these standards, the HCTs were not run long enough.
- A sufficient number of Pinal Schist and Precambrian Diabase samples were not tested, particularly in light of their static test results and demonstrated acid generating potential in the field. In addition, one of the two diabase samples representing the borrow material for the Ripsey Wash TSF embankment had a pyritic sulfur content of 0.95 percent, representing a higher acid generation potential than other potential borrow material in the area.
- Tailings samples that were tested were composited so that their net neutralizing potentials (NNP) were averaged. While this approach might be relevant if the tailings were assured of being constantly mixed to achieve the composite net neutralizing potential values, in reality ore would continue to be milled as it is available and it is conceivable that a particular lithology, for example, could be milled for a significant period. For this reason, it would have been appropriate to also conduct HCTs for non-composited samples of different lithologies for the maximum period of time.
- The proposed TSF would be constructed, in part, using cycloned tailings, with the underflow reporting to the beach and fines/slimes reporting to the interior of the TSF. Segregation of potentially acid generating pyrite can occur in the cyclone with a higher concentrate of pyrite and other minerals reporting to the cyclone underflow. The embankment-forming sands portion may be subject to higher potential for oxidation due to higher permeability. To avoid underestimation of potential for acid rock drainage, geochemical characterization programs for sites where cycloning is a feature of TSF construction frequently use samples representative of the underflow and overflow. This was not done for the proposed project.
- Radium 226 + radium 228, gross alpha, and total uranium were only analyzed once at the start of the HCTs because subsequent extract volumes were not sufficient for the required analytical method. Some of these parameters have been detected in tailings water, alluvium and borrow samples (DEIS, pp. 3-30, 31), as well as in monitoring wells in Ripsey Wash in concentrations above the Arizona Aquifer Quality Standard for gross alpha and up to  $111.7 \pm 6.4$  pCi/L total uranium<sup>4</sup>. Additional analysis is needed to characterize the potential impacts

<sup>3</sup> The International Network for Acid Prevention (INAP), 2009. Global Acid Rock Drainage Guide (GARD Guide). <http://www.gardguide.com/>.

<sup>4</sup> AMEC, 8/25/2014. 1<sup>st</sup> Quarter 2014 Groundwater Monitoring Report Proposed Ripsey Wash Tailings Storage Facility ASARCO Ray Complex Pinal County, Arizona; and 2<sup>nd</sup> Quarter 2014 Groundwater

of releases of these constituents from tailings and tailings drainage, alluvium, borrow materials, and bedrock for all alternative sites.

**Recommendation:** Require that additional humidity cell tests be conducted on representative numbers and types of samples of the following materials and for sufficiently long periods, consistent with best practice, to more reliably characterize and predict the Ray TSF tailings geochemistry, and include this information in the Revised DEIS:

- Pinal Schist and Precambrian Diabase ore samples representative of the entire 50-year life of the TSF, and which have not been composited;
- Pinal Schist and Precambrian Diabase tailings samples from the cyclone underflow and overflow, and which have not been composited;
- Precambrian Diabase bedrock in the area of Ripsey Wash from which embankment, seepage trench random fill, or other borrow or cover material could be sourced;
- Material within the Hackberry Fault zone;
- Analysis of radionuclides from tailings and tailings drainage, alluvium, borrow materials, and bedrock for all alternative sites;
- All surface and subsurface lithologies in Hackberry Gulch that could be exposed to tailings and tailings drainage, including alluvium/colluvium, borrow material and bedrock, including in local fault zones.

It is generally recognized that site analogs provide the best means of predicting future water quality. The existing Elder Gulch tailings facility is an excellent analog for predicting water quality in the proposed new TSF if the future tailings are expected to be similar to the Elder Gulch tailings. If properly characterized, the Elder Gulch tailings could provide additional insights regarding the potential for acid generation and metal leaching.

Based on the scant monitoring information we have seen for Elder Gulch, the potential impacts to groundwater and Gila River water quality could be worse than predicted in the DEIS. Asarco has indicated that it improperly used acid generating waste rock to construct the Elder Gulch TSF embankments and ascribes that TSF's history of contaminated seepage to exposure to that waste rock. We have not seen data supporting this conclusion, nor have we seen adequate data to rule out the inherent tailings geochemistry as the cause of Elder Gulch's contaminated seepage. Several underdrain discharge sources at Elder Gulch could provide useful sampling information, but no such information is provided in the HCT Report or DEIS.

The HCT Report does not provide information on existing Elder Gulch TSF seepage or pore water chemistry. As noted by the GARD Guide: tailings pore water quality is typically highly variable with depth; spatial differences in sulfide reactivity and pore water quality must be considered in the design of a TSF monitoring program; and collection of water samples from a tailings impoundment may include tailings slurry water from the point of discharge, tailings pore water, tailings pond supernatant, tailings seepage (embankment or from collection drains), and tailings runoff. Pore water characterization for the proposed new TSF is incomplete, however, as

only supernatant and slurry decant from Elder Gulch have been analyzed to support tailings water predictions. According to the Geochemical Characterization Report, several parameters were detected in the supernatant and slurry decant. Five metals with Arizona Water Quality Standards (AWQS) (antimony, arsenic, barium, chromium and selenium), four nonmetals with AWQSs (fluoride, nitrate as N, nitrite as N and nitrate-nitrite as N) and several radiochemicals with AWQSs (adjusted Gross Alpha, radium 226 and radium 228) were detected in one or more of the tailings water samples, with all results below their respective AWQS. Barium, selenium, fluoride, nitrate as N, nitrite as N, nitrate-nitrite as N, adjusted Gross Alpha, radium 226 and radium 228 were all detected in the sample of decant water, with all results below the AWQS. Additional information is needed on tailings pore water and drainage to thoroughly characterize the Elder Gulch tailings and tailings drainage for the purpose of predicting the future geochemistry of tailings and drainage in a new TSF. These parameters, and possibly others, could become more concentrated with longer residence times in the TSF.

Various methods may be used to collect tailings pore water from the unsaturated and saturated zones. In the unsaturated zone, core sample extraction can be conducted by centrifugation, pressurized consolidation and pore water displacement. Pore water in the saturated zone can be sampled using suction lysimeters.

**Recommendation:** Obtain and analyze the following additional data, and assess the geochemical characterization for Elder Gulch tailings, seepage, and reclaim water to more reliably predict the future geochemistry of tailings and water of the proposed new TSF. Include this information in the Revised DEIS. Much of this information may already exist from monitoring conducted pursuant to the Ray Mine/Elder Gulch APP.

- A history of all monitoring results associated with the Elder Gulch TSF and quality and quantity of water resources, including underdrainage, springs, seepage, surface water, and groundwater at points of compliance and other locations;
- Representative sampling of Elder Gulch tailings pore water from within the existing impoundment: (1) at various depths; (2) at various locations; and (3) in beach areas and fines areas;
- Sampling of underdrainage, reclaim water, and seepage collected from several points beneath the Elder Gulch TSF that have not had contact with the waste rock embankment material;
- A mass balance for the water and key constituents of the Elder Gulch TSF, showing the historic and existing water inputs and outputs;
- Geochemical characterization of the waste rock used for the embankment at Elder Gulch, as well as the Dripping Springs Quartzite and other bedrock and alluvium that constitute the base of the Elder Gulch TSF, and analysis of how these materials have influenced the quality of seepage and underdrainage there, for a better understanding of how Elder Gulch conditions should be used in predicting conditions in the proposed TSF.

### **Groundwater and TSF Modeling**

The DEIS (p. 3-171) states that the likelihood of a leak through the Ripsey Wash TSF seepage trenches or reclaim ponds causing down-drainage environmental problems to the Gila River is

very low. This conclusion is not supported in the DEIS nor in the characterization reports and design documents for the project. Based on our review of *Hydrogeologic Characterization Report, Proposed Ripsey Wash Tailings Storage Facility* (AMEC, July 10, 2014, “Hydrogeology Report”), the groundwater modeling conducted for this project appears inadequate. Assumptions regarding flux through the tailings and liner at various locations in the TSF and evaporation rates are not well supported and information, critical to determining whether the project is appropriately designed and would be appropriately managed to ensure protection of environmental resources over hundreds or thousands of years, is missing. Furthermore, no modeling was conducted for the Hackberry Gulch site or the Hackberry TSF design, and is needed for a proper evaluation of that alternative. Critical issues and information gaps include:

- The DEIS (pp. 3-72, 73) states that construction and operation of the Ripsey Wash TSF would decrease, and eventually eliminate, recharge to the Quaternary deposits within the TSF because of the low permeability of the tailings, and that, upon closure, any remaining water on the surface of the TSF or precipitation that falls onto the tailings would be subjected to the high evaporation rates that occur in this part of Arizona. Based on EPA’s experience, we disagree with those conclusions because: (1) the entire TSF would not have uniformly low permeability, and all rain water would not stay within the evaporative zone -- some would continue to infiltrate through the tailings; and (2) the tailings slurry water and rain water would continue to drain down into the alluvium below the TSF for hundreds of years or more.
- The groundwater modeling may under-predict the flux of water through the tailings to the subsurface, and seepage to the subsurface may not all be collected in the two proposed seepage collection systems over time. In light of the geology and hydrology of the Ripsey site and the Ray tailings geochemistry, appropriate TSF design (including liners and seepage collection systems) is critical to prevent tailings drainage from degrading groundwater and surface water quality. The DEIS does not provide adequate information to evaluate the design of the proposed TSF, nor to determine the operation and maintenance needs of the seepage collection system, both during operations and after closure.
  - The groundwater modeling only covers 65 years; however, drainage can reasonably be expected to continue for hundreds of years, or longer.
  - According to the Hydrogeology Report, the proposed TSF liner is designed to keep drainage from moving into the slightly to highly weathered bedrock material within the Hackberry fault zone. The assumptions regarding tailings permeability and the efficacy of the slime seal treatment along the Hackberry fault are not supported; therefore, the potential for drainage to seep through the fault cannot be ruled out.
  - Although the Elder Gulch TSF was also intended to be a zero discharge facility, substantial seepage has occurred from that facility. The DEIS does not explain how the proposed TSF design would differ from the Elder Gulch TSF such that it would prevent unintended seepage from the base and embankments of the new TSF.
- The DEIS anticipates a 10-year closure period (Fig. 13) with no post-closure period, and the cost estimates submitted by Asarco to ADEQ for its APP assume post-closure needs for only 30 years. The TSF and drain down solutions will likely need to be actively managed for

hundreds years or more. We were unable to find any drain down curves for the tailings solutions in the DEIS or support documents. This is critical information for determining closure and post-closure management needs; the anticipated costs for management; the potential impacts to water quality from these solutions; and measures that should be considered to optimize facility design for the operational, closure, and post-closure phases of the TSF. For example, a geomembrane beneath the entire TSF may prove not only more effective in capturing drainage but potentially more cost-effective as well. Characterization of the long-term post-closure fate and transport of water through the tailings and liner, alluvium and bedrock, and fault zones is needed to predict how much may be captured/controlled and how much may escape; however, this has not been done. Drain down curves under various cover scenarios would also help determine the effectiveness of evapotranspirative covers in reducing infiltration through the TSF.

- Based on actual conditions at numerous TSFs in the southwestern U.S., it is highly likely that the TSF, as designed, could cause uncontrolled seepage to the subsurface, which could contaminate the Gila River. It is unclear why fate and transport modeling of potential subsurface flow from the TSF to the river has not been done and analyzed in the DEIS to inform the evaluations of groundwater and surface water impacts. This is critical information for determining whether the proposed TSF design, operations, monitoring, closure and post-closure management, and financial assurance would effectively protect groundwater and Gila River water quality.
- A water management mass balance is needed in the EIS to estimate the anticipated and maximum flows and design capacities for the TSF Ripsey Wash and East Drainage seepage collection trenches relative to the 10,000,000-gallon/day TSF flow rate. This should also account for factors potentially affected by climate change over the TSF lifetime, as well as after closure (e.g., frequency and magnitude of storms, evaporation rates, etc.). Comparison against water mass balance in Elder Gulch may help confirm the appropriateness of assumptions used in a mass balance for a new TSF.
- There appears to be a mine tunnel opening onto Ripsey Wash in Section 15 where the Ripsey TSF embankment would be located.<sup>5</sup> A thorough survey of this area is needed to ensure that such a tunnel would not act as a conduit for TSF seepage or underdrainage.
- Several faults have been mapped within the Hackberry Gulch TSF site footprint, but no further information is presented on how faults have affected current activities at the adjacent existing Elder Gulch facility. Additional information should be provided on the known and anticipated effects of faulting at Hackberry and Elder Gulch sites and the need for careful TSF design here to prevent seepage through the shear zones.
- The DEIS concludes that, under the No Action alternative, existing conditions or “baseline” for several environmental resources would not change, as they would remain under current influences; however, this analysis is incomplete. For example, while a new TSF would allow for continued operations of the Ray Mine and Concentrator and continued groundwater

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<sup>5</sup> U.S. Geological Survey. Grayback, Arizona 1:24,000 Quadrangle (1970 Edition).

pumping from Asarco's wells for dewatering and process water at current rates, the No Action alternative presumably would not. We presume that, if no new TSF were permitted, a lack of new TSF capacity would result in operational changes at the Ray Mine and Hayden facilities; however, it is unclear from the DEIS what activities would change or be discontinued, and how such changes could affect surface water and groundwater resources relative to existing conditions (e.g., reduced pumping of wells could stimulate recovery of the water table and development of a pit lake, and increase flows in the Gila River, etc.).

- Similarly, the cumulative impacts analysis in the DEIS is incomplete, as it does not adequately describe the potential cumulative impacts to groundwater and surface water associated with a new TSF. For example, the DEIS does not identify pumping rates or discuss or depict the groundwater capture zone of the Ray pit, under current conditions and in future year intervals (e.g., 100 and 500 years), or discuss the fate and transport of contaminated groundwater from the mine and its current and eventual impacts on surface waters, including from the TSF at any of the alternative sites. Nor does it identify pumping rates at Asarco's Hayden area wells for process water at the Ray Mine, or assess the effects of this pumping on groundwater and the Gila River quality and quantity.

**Recommendation:** Obtain and, in the Revised DEIS, thoroughly analyze the above information for all TSF alternatives.

Figure 5 in the DEIS does not accurately depict the cross-sections of proposed features in the Main and East channel areas. For example, the primary and secondary monitoring wells are not consistent with what has been proposed in the draft APP. In addition, the seepage collection trench and collection system are not representative of what has been proposed. This is important for an understanding of how the system is designed to work and its potential environmental impacts in the event of failure. Furthermore, the DEIS does not include such a figure for the Hackberry seepage capture systems.

**Recommendation:** Include, in the Revised DEIS, additional figures, such as sheets 4, 5, and 6 from the Hydrogeology Report, which depict the design of the proposed seepage collection trenches in the Main and East channels. Include such a figure for the Hackberry seepage capture systems as well.

### **TSF Design**

More detailed information is needed to help determine additional siting, design and management needs of the proposed TSF, as discussed below and explained in further detail in our comments on the draft APP (Enclosure 4: pp. 5-7). This information is also important in comparing alternatives, including life-cycle costs, logistics and risks, to determine the LEDPA.

The DEIS (section 3.16.2.2.3) considers two modes of failure -- earthquake induced embankment failure (flow slide failure) and dam breach by overtopping -- and suggests that the possibility of either of these scenarios is extremely remote. This analysis is incomplete, based on other failure modes at large TSFs all over the world, including in Arizona. We note, for example, the tailings dam failure at the Pinto Valley mine in Arizona, which was not the result of either failure

mechanism but was apparently caused by piping through the embankment. Catastrophic events at Mount Polley Mine in British Columbia in 2014 and Samarco in Brazil in 2015 suggest that a catastrophic failure of any TSF is possible. The stability analyses conducted for the proposed tailings storage facility do not reflect current engineering standards for mine tailings dam construction. The most current standards can best be summarized in the findings of the Mt. Polley Expert Panel<sup>6</sup>, which considers the following components as best available tailings technology (BAT): elimination of surface water from the impoundment, unsaturated conditions in the tailings with drainage provisions, and achievement of dilatant conditions throughout the tailings by compaction. The Mt. Polley Expert Panel also concluded:

“The overarching goal of BAT is to reduce the number of tailings dams subject to failure. This can be achieved most directly by storing the majority of the tailings below ground -- in mined-out pits for surface mining operations or as backfill for underground mines.... Apart from this, surface storage using filtered tailings technology is a prime candidate for BAT.... Demonstrated technology for producing and placing filtered tailings (sometimes termed “dry stack” tailings) is well-known in the industry.... BAT should be actively encouraged for new tailings facilities at existing and proposed mines. Safety attributes should be evaluated separately from economic considerations, and cost should not be the determining factor.”

In addition to increasing stability of the TSF, dry stack technology would result in significant reduction of water transported through the TSF, liner, seepage collection systems and alluvium, thereby reducing the risk of contaminant releases beyond points of compliance and into the Gila River.

**Recommendation:** In the Revised DEIS, rigorously evaluate in-pit and dry stack storage alternatives.

If a wet tailings approach is used, additional analysis is needed in the EIS. It has been widely noted by expert geotechnical engineers that the increase of catastrophic risk to mine tailings dams significantly increases with both the height of tailings facilities and with the use of upstream dam construction techniques. Raising the Ripsey Wash TSF above elevation 2,200 feet (phase 3) would require additional seismic hazard studies and analyses, including liquefaction analyses, which have not yet been conducted.

**Recommendations:**

- Given the critical nature of this analysis, conduct the seismic hazard studies and analyses for phase 3 of the Ripsey Wash alternative now to ensure appropriate design for the life of the TSF, and verify this in the Revised DEIS.
- Perform a multi-stakeholder Failure Modes Effects Analysis to identify all potential failure modes and effects as well as appropriate design and mitigation measures for all practicable alternatives, and present this in the Revised DEIS.

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<sup>6</sup> Mt. Polley Expert Panel, January 30, 2015. Report on Mt. Polley Tailings Facility Breach, <https://www.mountpolleyreviewpanel.ca/>

- Given the long-term operations, closure and post-closure needs of the proposed TSF and its proximity to the Gila River, and based on a rigorous Failure Modes Effects Analysis, develop an Adaptive Management Plan (AMP) for the TSF designs and operations and include it in the comprehensive Monitoring and Mitigation Plan (MMP), recommended and described in our Mitigation comments below. The AMP should consider all geotechnical and other relevant data together with monitoring results as they become available, and detail the actions that would be taken to ensure that the TSF is constructed and operated to meet the required minimum factor of safety.

Descriptions and figures in the DEIS regarding important design elements of the proposed TSF design are vague and confusing. For example, page 2-9 mentions that the centerline embankment in Ripsey Wash would be underlain by a lined (60-80 mil HDPE liner or equivalent) drain system and a series of finger and blanket drains. These are not depicted in the DEIS, such as in figures 5 or 9. The description of the Hackberry Gulch embankment is vague and does not include a schematic (such as Figure 5, which is for Ripsey Wash).

**Recommendation:** Include, in the Revised DEIS, detailed descriptions and figures illustrating the TSF designs for all practicable alternatives.

Seepage collection trenches are proposed to be constructed within Ripsey Wash and the East Wash downstream of the dam to contain TSF seepage, which would be pumped back to the Reclaim Ponds and then to the Ray Operations for reuse. The DEIS provides no information on where the water would go during potential periods of temporary closure or at closure when the Ray Operations may not be available for reuse. It is likely that very long-term, perhaps perpetual, operation and maintenance would be needed to manage the drain down of the tailings, and information is needed (for both active and passive phases) on how this water would be collected, treated and discharged.

If the TSF results in degradation of water quality in the groundwater and/or surface water, the costs of long-term or perpetual seepage collection, groundwater pumping and treatment could be much higher (e.g., by two orders of magnitude or greater) than those currently estimated by Asarco for the TSF's post-closure needs. In our scoping and ADEIS comments, we recommended that gravity drains and passive treatment and transport systems be seriously considered for closure and post-closure management of the tailings drainage, which could potentially obviate the need for pumping and reduce long-term post-closure costs. It appears, however, that the proposed Ripsey Wash collection sump may be too low for passive collection and control. The Hackberry collection systems may accommodate a passive system, which would allow for gravity flow of solutions back to the mine.

**Recommendation:** Evaluate design options for the operational phase of the TSF that could also prove beneficial during closure and post-closure. For example, we recommend that a more reliable liner system beneath the entire TSF be seriously considered, as well as gravity drains and passive treatment and transport systems for closure and post-closure management of the tailings drainage, all of which could reduce long-term post-closure costs. Discuss this in the Revised DEIS.

## **Mitigation**

The DEIS (3-74) states that, should groundwater monitoring indicate exceedance of an APP performance standard, mitigation measures prescribed in the APP would be implemented. While the draft APP states that additional monitoring and reporting would be required and ADEQ may require corrective action, specific mitigation measures are not prescribed. Deferring to the APP, which does not identify mitigation measures, does not satisfy the Corps' responsibility under NEPA to include in its analysis of alternatives "appropriate mitigation measures not already included in the proposed action or alternatives" (40 CFR 1502.14(f)).<sup>7</sup> A well-considered and thorough plan to avoid the types of problems that have occurred at several other large TSFs is critical to successful management of a new TSF for the Ray Mine. Additional information is needed to ensure that water quality standards can and would be achieved and sustained in the future.

**Recommendations:** Develop a comprehensive Mitigation and Monitoring Plan for all aspects and phases of the proposed project, including the long-term post-closure phase, and include it in the Revised DEIS. Describe, in the Revised DEIS, the anticipated effectiveness of the mitigation measures. Include, in the MMP, an Adaptive Management Plan that clearly articulates the proposed project's management objectives, options for operating the TSF to meet those objectives, and monitoring commitments, including effectiveness monitoring. The objectives identified in the plan should be site-specific, explicit and measurable, and the triggers, thresholds, and Asarco's associated action commitments should be well defined. For each action level or trigger, include a description of necessary follow-up actions and potential corrective actions that would be needed to avoid or correct adverse impacts to the environment, along with an estimate of the time needed to implement such measures. The uncertainties regarding, and vulnerabilities of, the local hydrogeology and effectiveness of the TSF design should be identified so that appropriate monitoring is developed to not only track anticipated and potentially foreseeable responses to management, but also to uncover unexpected results. Address, in the MMP, unanticipated, but reasonably foreseeable, mine failure scenarios that can and have happened at large TSFs, such as pipeline failures, spills, leaks, and slope failure, and identify the parties who would be involved in implementing and enforcing the MMP.

The DEIS (App. I, Applicant Project Mitigation) provides surface water and groundwater protection measures for only the Ripsey Wash alternative, but not for the Hackberry Gulch alternative.

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<sup>7</sup> CEQ guidance states, "Agencies should ensure that the expertise and professional judgment applied in determining the appropriate mitigation commitments are described in the EA or EIS, and that the NEPA analysis considers when and how those mitigation commitments will be implemented....[M]itigation commitments should be carefully specified in terms of measurable performance standards or expected results, so as to establish clear performance expectations....When an agency funds, permits, or otherwise approves actions, it should also exercise its available authorities to ensure implementation of any mitigation commitments by including appropriate conditions on the relevant grants, permits, or approvals." [CEQ, *Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact*. 76 Fed. Reg. 3843, 3848-3849 (Jan. 21, 2011)].

**Recommendation:** Identify in the Revised DEIS any measures that would mitigate impacts to water resources from the Hackberry Gulch alternative or other reasonable alternatives, which may be different from those identified for the Ripsey Wash alternative.

## **Monitoring**

The DEIS acknowledges that the APP would require compliance monitoring along the groundwater compliance boundary downgradient of the TSF for the Ripsey Wash or Hackberry Gulch alternatives. Information provided in the DEIS is not consistent with the proposed APP monitoring requirements. Figure 5 in the DEIS depicts two sets each of primary and secondary monitoring wells downgradient of the Ripsey Wash TSF; however, the draft APP only requires one set of primary monitoring wells in the Main Channel, one well east of the East Channel, and one well west of the TSF in the Hackberry Fault zone. Furthermore, based on maps in the Hydrogeology Report, MW-2 appears to be on the east side of the East Channel, rather than in the channel where alluvial flow could be monitored. According to the DEIS (pp. 3-61, 62), this well's depth to bedrock is zero feet, and it had extremely low groundwater yield. This does not appear to be an appropriate location for a point of compliance (POC) well to monitor groundwater in the vicinity of the East Channel. EPA's March 4, 2016 comments to ADEQ on the draft APP for the Ripsey Wash TSF provide additional observations and recommendations, some of which are listed below, regarding the proposed APP monitoring requirements.

**Recommendation:** Include the following measures in the Ripsey Wash alternative if it is deemed the preferred alternative. Specify, in the Revised DEIS and comprehensive MMP, which measures are commitments, and how and by whom they would be enforced.

- Install monitoring wells MW-X and MW-Y, and conduct background and compliance monitoring prior to TSF construction.
- Install a monitoring well in the paleochannel east of the Main channel and downgradient of the TSF to ensure drainage is not seeping through at that location.
- Install a monitoring well in Ripsey fault to ensure that water from the TSF is not leaking through the fault zone. Existing monitoring wells upgradient of the fault would be helpful to establish baselines for this purpose.
- Locate a new POC well in the East Channel.
- Add gross alpha and uranium to the list of ambient groundwater monitoring parameters.
- Monitor Gila River water quality for all parameters listed in Table 4.2.2 of the draft APP plus gross alpha and uranium at points upgradient and downgradient of the TSF to establish baseline, and conduct ongoing quarterly monitoring to detect trends.
- Monitor water quality in the Main and East seepage collection trenches and Main and East reclaim impoundments to confirm quality of TSF seepage/reclaim water for purposes of understanding future water management needs should this water escape the seepage collection systems.
- Monitor for copper, gross alpha and uranium in addition to the parameters in Table 4.3.1 of the draft APP (Contingency Discharge Characterization for BADCT Failures and Overtopping).

- Establish background levels for all parameters in Table 4.2.2 of the draft APP, and monitor those parameters for compliance (draft APP, Table 4.2.3) during operations and closure.
- Identify the compliance monitoring Alert Levels and Aquifer Quality Limits in the Revised DEIS and comprehensive MMP.
- Update Figure 5 in the Revised DEIS to indicate correct locations of monitoring wells.

### **Existing Conditions**

We note that the background water quality information from wells in the vicinity of Hackberry Gulch is at least 15 years old and incomplete (DEIS, Table 3-39). Numerous wells exist in the area, many owned by Asarco, but none were used to characterize current conditions. Figures 28 and 31 show wells and seeps that are very near to, and may be affected by, the Elder Gulch TSF. These include Seep 4 and HW-30 in the Belgravia Wash drainage area, as well as the four unnamed seeps and HW-26 and HW-28 to the northeast of that drainage and just below the Elder Gulch TSF. Water quality and flow data from these sources would be useful in characterizing the existing conditions in the vicinity of the Hackberry Gulch alternative and in characterizing the effectiveness of the existing Elder Gulch TSF design for purposes of confirming appropriate design needs for the Hackberry Gulch alternative. This information would inform the comparison of this alternative to the Ripsey Wash and other reasonable alternatives.

**Recommendations:** Provide in the Revised DEIS an accurate summary of all sampling data from Asarco wells and seeps and springs on Asarco owned lands in the Hackberry Gulch TSF vicinity, particularly Seep 4 and HW-30 in the Belgravia Wash drainage area and the four unnamed seeps and HW-26 and HW-28 to the northeast of Belgravia Wash and just below the Elder Gulch TSF. If sampling events were not sufficiently recent or thorough for an accurate description of current conditions, conduct appropriate sampling and analysis for this purpose.

### **Temporary or Permanent Closure and Post-Closure Management**

The DEIS (p. 2-17) states that, during any temporary shutdown of the Ripsey Wash TSF, Asarco would continue to implement operational and environmental maintenance activities to ensure the TSF meets permit stipulations and requirements for environmental protection. The draft APP, however, includes no substantive requirements or specific commitments to ensure that the TSF would continue to be managed in the event the mine temporarily closes because of market fluctuations or another Asarco bankruptcy. Interruption of the management of drain down fluids could result in serious adverse environmental impacts, including contamination of the Gila River. Specific commitments and are needed to ensure that critical fluid management would be continued.

**Recommendation:** Develop and include in the Revised DEIS an Interim (Emergency) Fluid Management Plan for the TSF that includes information and procedural commitments to ensure that critical fluid management would be continued during temporary shutdown. Our detailed recommendations for such a plan can be found on page 9 of Enclosure 4.

Long-term, potentially perpetual, post-closure monitoring and maintenance of the TSF would be needed to ensure stabilization and control of fluids from the proposed facility; however, the DEIS provides only very conceptual information on these needs. The draft APP does not include plans for closure or post-closure management of the TSF, as ADEQ does not require these plans to be prepared until just before those phases begin. The relevant information on measures to be implemented during those phases, which was submitted by Asarco in its APP application, is also extremely conceptual and only acknowledges needs for the first 30 years beyond closure. There is no guarantee that any closure and post-closure care would occur. Without it, the proposed project would result in unacceptable long-term environmental degradation.

**Recommendation:** Provide more detailed information on the entire life cycle management and monitoring requirements of the TSF in the Revised DEIS, and specify which commitments are enforceable. Include the closure and post-closure monitoring and mitigation plans in the comprehensive MMP recommended above. The plans should describe monitoring requirements, the mitigation actions that would be taken should destabilization or contamination be detected, the action thresholds and triggers; identify who would be responsible for implementing and enforcing these actions; and explain how they would be funded. This would not only better inform the true costs of responsible management of the Ray TSF, but could result in improved design options that would facilitate more reliable and cost-effective closure and post-closure management of tailings drain down solutions.

### **Financial Assurance**

Many state and federal agencies have developed financial assurance requirements for mines to ensure that funds will be available when they are needed, and for as long as may be needed, to satisfy closure and post-closure management obligations to prevent destabilization of facilities and degradation of environmental resources. Financial assurances should be disclosed in the DEIS because the viability of the closure and post-closure management is a critical factor in determining whether the project may be considered satisfactorily protective of environmental resources. If mitigation funds would not be adequate to effectively protect environmental resources from significant and long-term degradation, the project would be environmentally unacceptable. Such assurances could make the difference between the project being sufficiently managed over the long-term by the site operator, versus an unfunded or under-funded contaminated site that becomes a liability for taxpayers, e.g., under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

While neither the DEIS nor its support documents include any information regarding financial assurances for closure and post-closure management of the proposed TSF, EPA was able to access some financial assurance information by reviewing ADEQ's draft APP, Asarco's APP application, and Asarco's closure cost estimate for that permit application prepared by EEC (June 11, 2015). Based on EPA's substantial experience with long-term impacts from mining, we are concerned that, if Asarco were to go bankrupt and abandon the site, the necessary funds to satisfy its obligations would not be available because the draft APP: (a) significantly underestimates the costs of closure and post-closure monitoring and management needs, either in the event of early shut down before the end of the planned mine life or upon an orderly closure,

as planned, at the end of mine life; (b) allows use of a financial assurance instrument for which Asarco has not demonstrated its ability to meet the criteria for its use, based on a recent demonstration of its financial condition; and (c) does not obligate Asarco to manage the TSF beyond 30 years after closure and, therefore, makes no provision for financial assurances for that care.

In response to EPA's ADEIS recommendations that the DEIS discuss the amount and type of financial assurance that would be required for the project, the Corps responded that financial assurances for closure and reclamation are outside the purview of the Corps and under the authority of other regulatory agencies. Without addressing authority issues, we note that CEQ guidance states that all relevant, reasonable mitigation measures that could improve the project are to be identified in an EIS, even if they are outside the jurisdiction of the lead agency or the cooperating agencies and, to ensure that environmental effects of a proposed action are fairly assessed, the probability of the mitigation measures being implemented should be discussed.<sup>8</sup> Furthermore, CEQ guidance views a discussion of funding for implementation of mitigation commitments as critical to ensuring informed decision making, and has stated that agencies should not commit to mitigation measures if it is not reasonable to foresee the availability of sufficient resources to ensure the performance of the mitigation.<sup>9</sup>

#### Cost Estimates

EPA has determined that that Asarco's total closure and post-closure cost estimate of \$16,228,443 for the proposed Ripsey Wash TSF would not be adequate to cover the full costs of closure and post-closure of the site over the first 30-year post-closure period. It appears that \$15,583,015 of that is for closure activities. Notable omissions in the closure cost estimate, which should be included in a revised cost estimate include the following:

- Costs of managing TSF drain down solutions (pumping, pump system maintenance, etc.)
- Costs of reclaim pond and drain down pond residue sampling and disposal;
- Costs of embankment regrading;
- Costs of revegetation.

It appears that only \$645,428 of the draft APP cost estimate is for monitoring and maintenance over the first 30-year post-closure period. We have estimated that, at a minimum, \$9,343,000 would be needed to cover the costs of monitoring and maintenance during that time. Thus, rather than \$16,228,443, we estimate that the total costs of closure plus the first 30 years of post-closure would be at least \$24,926,000. In addition, the DEIS (p. 2-5) identifies other measures that are integral to proper management of the TSF and protection of water quality, such as monitoring, operation and maintenance of the stormwater detention basins, stormwater diversion channels and pipelines, and TSF spillway, and page 2-18 indicates that long-term (potentially perpetual) maintenance of the stormwater diversion systems would be needed. EPA agrees that such measures are critical; however, they are not required in the draft APP nor included in the

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<sup>8</sup> CEQ, Memorandum for Federal NEPA Liaisons, Federal, State and Local Officials and Other Persons Involved in the NEPA Process, Question 19b, March 16, 1981.

<sup>9</sup> CEQ, *Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact*. 76 Fed. Reg. 3843, 3848-3849 (Jan. 21, 2011).

APP cost estimate, and it is unclear who would be responsible for implementing or enforcing them. The lack of specific commitments and financial assurances to ensure that these measures are implemented, and the absence of clear means to enforce them, pose significant risks to the integrity and effectiveness of the TSF and, hence, to water resources over the operational life of the TSF and for hundreds of years, or longer, after closure.

The true and full life cycle costs of managing the TSF were not included in the draft APP cost estimate because ADEQ only assumed a 30-year post-closure period. It is critical that Asarco's responsibility for all monitoring and management costs for the duration of the project and its closure and post-closure site management be clearly established prior to project initiation, while financial interest in the project is high and financial assurance mechanisms are available to the company, rather than waiting until 30 years after a planned closure or unplanned shutdown to acknowledge that the mine operator would have post-closure financial liabilities for hundreds of years. Notable omissions in Asarco's post-closure cost estimate, which should be included in a revised cost estimate, include the following:

- Costs of managing TSF drain down solutions (pumping, pump system maintenance and replacement, evaporation pond maintenance and replacement, water treatment if needed, etc.);
- Costs of operation and maintenance of stormwater detention basins, stormwater diversion channels and pipelines, and TSF spillway;
- Costs of vegetation and erosion maintenance;
- Costs of monitoring and maintenance of tailings dam and other facilities;
- Costs of maintaining roads and monitoring locations;
- Costs of conducting monitoring, including facilities monitoring, water quality sampling and analysis, etc.;
- Associated indirect costs.

We have estimated that the net present value of *all* post-closure obligations for hundreds of years (including the first 30-year post-closure period at \$9,343,000, as described above) is at least \$11,000,000. This is in addition to the \$15,583,015 closure amount estimated for the draft APP. It is important to note that, if the TSF results in degradation of water quality in the groundwater and/or surface water, long-term, perhaps perpetual, additional seepage collection, groundwater pumping and treatment may be needed, which could increase these costs *by an order of magnitude, or more*.

**Recommendations:** Include the following in the Revised DEIS:

- Recalculated closure and long-term post-closure costs for the proposed project, including appropriate costs for the additional activities identified above;
- An assessment of the likelihood that adequate financial assurances would be available to satisfy all of Asarco's financial obligations for the project; and
- A description of the potential effectiveness of the financial assurance to ensure adequate protection of environmental resources in the project area over the long term.

### Financial Assurance Mechanisms

Asarco went bankrupt in 2005 (the largest environmental bankruptcy in U.S. history at the time), and emerged from bankruptcy in 2009. According to Asarco's 2014 APP application, the company applied to ADEQ for a financial capability test with a 2009 audit, in lieu of posting other financial assurance instruments such as a surety bond or a form of cash or its equivalent. That audit was used to demonstrate that Asarco would be capable of covering its original \$4,882,600 estimated closure costs. It is unclear whether an updated audit has been submitted and assessed with respect to the updated \$16,228,443 cost estimate, which, as discussed above, falls short of what EPA estimates is needed to adequately cover necessary closure and post-closure tasks.

It is important to secure highly reliable closure and post-closure mechanisms at the inception of a new TSF project. However, it is not clear that Asarco's financial test documentation adequately demonstrates its ability to cover even the \$16,228,443 amount proposed in the draft APP for closure or post-closure obligations. Asarco's financial test demonstration did not account for any long-term post-closure obligations, which would be needed for the proposed TSF. In addition, Asarco's 2009 balance sheet claimed, for its total closure liabilities at the Hayden, Mission, Ray and Elder Gulch sites, only \$33,848,465 – an amount which EPA estimates is far too low to cover the measures we expect to be necessary to protect environmental resources when those facilities close. Nor does that sum account for any long-term post-closure costs at those facilities. As the financial test was based on 2009 financial data, the submission would not capture ASARCO's current financial position. For example, the APP financial test demonstration would not have accounted for an additional substantial liability incurred by Asarco under a recent settlement with EPA and the Department of Justice regarding its Hayden facilities. In December 2015, Asarco entered a Consent Decree which requires the company to install new equipment and pollution control technology to reduce emissions of toxic heavy metals at the Hayden smelter, estimated at a minimum value of \$150,000,000; fund local environmental projects valued at \$8,000,000; replace a diesel locomotive with a cleaner model, estimated at \$1,000,000; and pay a \$4,500,000 civil penalty.

Furthermore, in order to ensure the availability of funding to cover the costs of performing post-closure monitoring and maintenance tasks for hundreds of years, we recommend the establishment, at the beginning of the project, of a long-term funding mechanism that would be readily available for as long as it may be needed (e.g., many hundreds of years, perhaps into perpetuity). For example, a trust fund would involve an initial investment and growth over the operational phase so that sufficient money is available whenever it is needed after closure. The appropriate level of funding, types of allowable investments, and mechanics of a trust fund are critical to ensuring it would be available when it is needed. The financial assumptions used to estimate the funding level (e.g., net present value) and the projected growth rate and mechanics of the fund are important. The contingency of mine closure significantly earlier than planned should also be taken into account in establishing the long-term funding mechanism and initial investment amount.

Important financial assumptions and mechanics that should be considered for such a trust fund include: (a) requirements for timing of payments into the trust fund; (b) how Asarco would ensure that the trust fund is bankruptcy remote; (c) acceptable financial instruments; (d) legal

structure of the trust for tax purposes; (e) who would pay the taxes on trust earnings and trust fees and expenses, including if Asarco goes out of business; (g) who would make investment decisions if Asarco is no longer viable; (h) the identity of the trust fund beneficiaries; and (i) the identity and corporate structure of the operator with responsibility/liability for financial assurance at this site.

**Recommendations:** Disclose in the Revised DEIS how Asarco would finance the closure and long-term post-closure activities at the proposed TSF, including the coverage amounts and type(s) of financial instruments, accounting for early closure contingencies, and the effectiveness of this commitment to ensure against environmental degradation.

### **Air Resources**

The proposed project area is in non-attainment of PM10 (particulate matter smaller than 10 microns) air quality standards. Tables 3-3 and 3-7 in the DEIS provide estimates of PM10 emissions for the Ripsey and Hackberry alternatives, which are, in some early construction years, extremely close to the PM10 *de minimis* threshold of 100 tons per year. The ERM (2014) emissions calculations referenced in these tables, however, indicate that year 2 emissions of PM10 in Ripsey Wash would be 110.42 tons per year, which exceeds the *de minimis* threshold. The DEIS (App. I, p. 3) states that fugitive dust control measures would include watering and other measures developed pursuant to a Pinal County dust control permit, and ERM's PM10 emissions estimates assumed that road watering every four hours would account for 75 percent dust control. This assumption may be unreasonably optimistic for this climate; therefore, PM10 emissions could be significantly higher than ERM estimates.

**Recommendation:** To support the PM10 emissions estimates, provide, in the Revised DEIS, documentation to demonstrate that road watering, done every four hours, achieves 75 percent dust control efficiency. Information on fugitive dust emissions from the same types of vehicles, activities, and conditions at the Ray mine would provide a good analog for such a demonstration. If this cannot be demonstrated, disclose actual watering rates and dust control efficiencies at the Ray Mine or a similar site and recalculate the dust emissions for all TSF alternatives.

EPA's guidance on General Conformity applicability analyses states, "the Federal agency can take measures to reduce its emissions from the proposed action to in fact below *de minimis* levels and, thus, the rule would not apply. The changes must be State or Federally enforceable to guarantee that emissions would be below *de minimis* in the future."<sup>10</sup> It is unclear whether the DEIS's assumed dust control efficiencies would be required in the Pinal County dust control permit and, therefore, enforceable.

**Recommendations:** Clarify, in the Revised DEIS and the comprehensive MMP, the mechanisms that would be used to ensure that emissions reductions are enforceable and achievable. If recalculated PM10 estimates exceed *de minimis* thresholds, demonstrate, in the Revised DEIS, that the project would conform to the State Implementation Plan. EPA

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<sup>10</sup> General Conformity Guidance: Questions and Answers (Response to Question 29), July 13, 1994  
[http://www.epa.gov/air/genconform/documents/gcgqa\\_940713.pdf](http://www.epa.gov/air/genconform/documents/gcgqa_940713.pdf)

encourages the Corps to work with the Pinal County Air Quality Control District in developing the Draft General Conformity Determination for the project. Include the Draft General Conformity Determination in the EIS, either as a detailed summary or as an appendix.

The DEIS (App. I, p. 3) states that, if visual observation suggests that excessive dust is being generated, a Method 9 trained operator would determine whether opacity and other permit standards are being met. It does not indicate what mitigation measure(s) would be implemented based on the findings of this monitoring measure.

**Recommendation:** Identify, in the comprehensive MMP, the mitigation measures that would be implemented if opacity or other permit standards were not being met.

The DEIS identifies other measures, such as applying tackifier or rock material on outer TSF slopes, which Asarco plans to do; however, it is unclear whether these are applicant-committed measures that would be enforceable throughout the project. We note that Pinal County's dust control requirements include such measures as applying surface watering and chemical stabilizers, reducing vehicle speeds on unpaved roads, and implementing track out controls. Additional measures may be applicable to the proposed project to reduce project emissions.

**Recommendations:** Identify, in the Revised DEIS and comprehensive MMP, additional mitigation measures that would be implemented to minimize air pollutant emissions from the proposed project, and specifically include measures to address potential impacts to nearby residents, including sensitive receptors. We recommend appropriate mitigation measures to reduce diesel particulate matter (DPM), criteria pollutants, and greenhouse gas emissions, such as the following:

- Procure new nonroad construction equipment that are non-diesel, or use diesel engines that meet or exceed emission requirements for model year 2015, to reduce diesel particulate matter (DPM), NO<sub>x</sub>, and other pollutants;
- For existing equipment, use diesel particulate filters and other appropriate controls to reduce emissions of DPM and other air pollutants. Diesel particulate filters control approximately 80 percent of DPM, 85-90 percent of hydrocarbon emissions, and 50-90 percent of carbon monoxide;
- Minimize construction-related trips of workers and equipment, including trucks and heavy equipment; and
- Employ periodic, unscheduled inspections to ensure that construction equipment is properly maintained at all times and does not unnecessarily idle, is tuned to manufacturer's specifications, and is not modified to increase horsepower except in accordance with established specifications.

We recommended, in our comments on the ADEIS, that the DEIS include the estimated direct, indirect, and cumulative emissions from all Ray mine operations and facilities, such as roads, construction, blasting, excavation, and processing, that create the need for the proposed TSF and the smelter. Emissions sources also include off-site processing and other activities (e.g., employee vehicle traffic and delivery trucks) in the cumulative effects study area. We also

recommended that the DEIS discuss the sulfur dioxide (SO<sub>2</sub>) non-attainment area designation associated with Asarco's Hayden smelter and the copper ore from Ray Mine. The DEIS, however, does not disclose any of this information.

Information on existing and projected future emissions from Asarco's Ray Mine and Hayden facilities is relevant because the Corps' issuance of a 404 permit for fill associated with a new TSF would allow for continuation of operation of most or all of these facilities through their design lives, but the No Action alternative presumably would not. It is unclear from the DEIS whether, under the No Action alternative, mining and dump leaching would continue at the Ray Mine or by what percent smelting would decrease at the Hayden smelter, and the impacts to air quality under the No Action alternative were not assessed. The DEIS (p. 3-6) states only that air quality in the region would remain under the influence of industrial sources (Hayden smelter) and existing land use trends, and surmises that the PM<sub>10</sub> non-attainment area, "with current and anticipated land use trends, would probably retain its designation." EPA disagrees as it is likely that, if no new TSF were to be permitted, air pollutant emissions at the Ray Mine and Hayden facilities would significantly decrease.

Emissions from the Hayden smelter will be significantly reduced under the terms of the recent Asarco settlement, discussed above. The Hayden area of Gila and Pinal Counties is currently classified as non-attainment for the 2008 lead National Ambient Air Quality Standard (NAAQS) and the 1-hour primary SO<sub>2</sub> NAAQS. Since the smelter is the only source of lead and SO<sub>2</sub> emissions in the Hayden non-attainment area, emission reductions must come from that facility to allow for attainment of the NAAQS. Emissions reductions that result from the recent settlement will help address both the Hayden area's lead and SO<sub>2</sub> NAAQS non-attainment status, as well as reduce community exposure to arsenic and other hazardous air pollutants, and particulate matter, including PM<sub>10</sub>, and PM<sub>2.5</sub>. EPA estimates that the settlement will reduce emissions by no less than approximately 3,500 tons per year of particulate matter and 8.5 tons per year of hazardous air pollutants.<sup>11</sup>

**Recommendation:** Discuss in the EIS the nexus between ore processing and tailings creation at the Ray Mine and the SO<sub>2</sub> and lead non-attainment area designations associated with Asarco's Hayden smelter. Provide the estimated direct, indirect, and cumulative emissions of criteria pollutants, hazardous air pollutants, and greenhouse gases from all Ray Mine and Hayden smelter facilities under each alternative, including the No Action alternative.

### **Proposed Ray Land Exchange**

The DEIS (p. 1-3) states that the proposed Asarco Ray land exchange, which is the subject of a Supplemental EIS currently being prepared by the Bureau of Land Management, was not intended to acquire fee title to land for additional tailings storage. This is not accurate. Written records of our discussions with BLM and Asarco during preparation of the original 1998 Land Exchange EIS (including our January 28, 1999, DEIS comment letter) indicate that Asarco intended to use parcel RM-18 for tailings storage. RM-18 includes a substantial BLM-managed

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<sup>11</sup> <https://www.epa.gov/enforcement/asarco-llc-settlement>

portion of the Hackberry Gulch TSF alternative site. The rest of the Hackberry Gulch site is owned by Asarco. The Proposed Ray TSF DEIS does not consider how a TSF under a BLM Mine Plan of Operation would differ from a TSF under an APP. The West Dam and Granite Mountain alternative sites, which we have indicated were prematurely eliminated from detailed analysis in this DEIS, are also on BLM land and included in the Ray Land Exchange Supplemental EIS as parcels that Asarco wishes to acquire.

**Recommendation:** As the Ray Land Exchange has not occurred and these parcels are still under BLM management, the EIS should assess the Hackberry Gulch and other feasible alternatives on BLM parcels in the context of BLM management of the TSF under a Mine Plan of Operation, including requirements for financial assurance.





**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**  
**REGION IX**  
**75 Hawthorne Street**  
**San Francisco, CA 94105**

**OFFICE OF THE  
REGIONAL ADMINISTRATOR**

**APR 29 2016**

Colonel Kirk E. Gibbs  
District Engineer, Los Angeles District  
U.S. Army Corps of Engineers  
915 Wilshire Boulevard  
Los Angeles, CA 90017

Subject: Public Notice (PN) SPL-2011-01005-MWL for the proposed Ray Mine Proposed Tailings Storage Facility (TSF), Pinal County, Arizona.

Dear Colonel Gibbs:

The U.S. Environmental Protection Agency (EPA) has reviewed the subject PN dated January 29, 2016 for the Ray Mine Tailings Storage Facility (TSF) project proposed in Pinal County, Arizona. After consultation with your staff, EPA also traveled to the site on February 9, 2016, and met with the Arizona Department of Game and Fish, U.S. Fish and Wildlife Service, and the project applicant to discuss alternatives and mitigation sites. EPA appreciates the extension of the PN comment period to May 5, 2016, and the dialog with your staff that has been ongoing since we accepted Cooperating Agency status in 2013.

EPA is submitting the enclosed comments to the Corps on this permit application consistent with the Clean Water Act (CWA); final EPA comments on the Draft Environmental Impact Statement (DEIS) are being transmitted under separate cover. This letter follows the field level procedures outlined in the 1992 Memorandum of Agreement between the EPA and the Department of the Army, Part IV, paragraph 3(b) regarding section 404(q) of the CWA. Based on our review of the currently available information, the EPA is hereby notifying the Corps that the TSF permit is a candidate for review by EPA and Corps headquarters because the discharges as proposed will result in substantial and unacceptable impacts to Ripsey Wash and the Gila River, which are aquatic resources of national importance (ARNI).

The Gila River was designated ARNI in 2005, and is one of the most significant aquatic resources in Arizona, providing municipal and agricultural water supplies and innumerable in-stream benefits for fish, wildlife, and recreation. Ripsey Wash is a significantly sized, ecologically intact, direct tributary to the Gila River, located at the lower-end of an undisturbed 15.5 square mile watershed; it provides outstanding individual and cumulative support to the chemical, physical and biological integrity of the Gila River's aquatic ecosystem. The proposed project would eliminate 130 acres of waters of the U.S. (waters) including 65 acres of Ripsey Wash.

Unfortunately, since EPA provided our December 18, 2014 Cooperating Agency comments, these proposed impacts to the aquatic resources reflect no substantive change. EPA remains concerned that substantial and unnecessary loss and/or degradation of the aquatic ecosystem is likely if the TSF is

constructed and operated as proposed. The Corps' DEIS, and statements from the applicant in the field, point to practicable alternatives that have not been adequately considered; the proposed action therefore does not appear to be in compliance with 40 CFR 230.10(a) which restricts the Corps to permitting only the Least Environmentally Damaging Practicable Alternative (LEDPA). These alternatives impact significantly less acreage of waters, and pose substantially lower risk to the integrity of the Gila River. The proposed TSF also does not appear to comply with 40 CFR 230.10(b) as it poses substantial water quality threats to the Gila River 0.3 miles downstream. Finally, the Guidelines at 40 CFR 230.10(d) require all practicable avoidance of impacts, and compensation for those that are unavoidable. Adequate financial assurance similar to that required of mines on public lands represent practicable steps that would help the proposal comply with this section of the Guidelines and factors under the Corps' Public Interest Review. Compensatory measures are also insufficiently described at this time.

EPA looks forward to continuing our Cooperating Agency role in this project. If you have any questions, please call Deputy Regional Administrator Alexis Strauss at (415) 972-3572. Alternatively, your Regulatory Division Chief may contact Jason Brush, Supervisor of our Wetlands Section, at (415) 972-3483.

Sincerely,

A handwritten signature in blue ink, appearing to read "J. Blumenfeld", is written over the typed name.

Jared Blumenfeld

cc: Misael Cabrera, Arizona Department of Environmental Quality  
Ray Suazo, Bureau of Land Management, Arizona State Office  
Francisco Mendoza, Bureau of Land Management, Tucson Field Office  
Ferris Begay, Bureau of Indian Affairs, San Carlos Irrigation Project  
Larry Voyles, Arizona Game and Fish Department  
Steve Spangle, U.S. Fish and Wildlife Service  
Mike Sundblom, Pinal County Air Quality Control District

# **DETAILED COMMENTS ON THE PROPOSED RAY MINE TAILINGS STORAGE FACILITY 404 PERMIT APPLICATION # 2011-01005-MWL**

## **I. Project Description and Potential Impacts**

The permit applicant, Asarco, is the owner and operator of Ray Mine, an open pit copper mine with onsite concentrator and leaching facilities located in Pinal County, Arizona, about 10 miles northwest of the community of Kearny and approximately 65 miles southeast of the city of Phoenix. Currently, mine tailings are placed at its existing facilities, Elder Gulch and Hayden AB-BC and D tailings impoundments. With Elder Gulch expected to reach capacity over the next 5-7 years, Asarco proposes to construct a new TSF for additional storage.

The proposed TSF would impact Ripsey Wash and other desert streams located approximately four miles southwest of the mine operations and present tailings facility. The TSF as described would result in the loss of 134 acres of waters associated with Ripsey Wash, the Gila River, and unnamed washes. In addition to the tailings facility, Asarco would construct a new pipeline, pumping booster station, containment ponds, a bridge across the Gila River, stormwater detention dams and diversion systems, and other infrastructure needed to transport tailings from the existing thickener to the TSF. Tailings would be discharged from spigots around the perimeter of the tailings areas, and water would accumulate at the rear of the TSF and would be pumped back to the Ray Concentrator via pipelines for reuse in the milling process. A 6.8 mile segment of the Arizona National Scenic Trail would be relocated and a 6.4 mile bypass would be constructed to maintain a scenic trail across the state of Arizona. The proposed facility would also require replacing 1.8 miles of Florence-Kelvin Highway with a new 2.1 mile segment routed around the facility.

The substantial impact of the preferred alternative is demonstrated by the permanent fill of 130 acres of jurisdictional waters in the Ripsey Wash subbasin, and the high likelihood that hazardous constituents will degrade water quality in the Gila River due to a lack of adequate and practicable post-closure management and financial assurance. The unacceptable nature of these impacts is clear because alternatives to the discharge and financial risk mitigation are practicable, making impacts to ARNI unnecessary.

## **II. Gila River and Aquatic Resources of National Importance (ARNI)**

The Gila River, first designated ARNI in 2005, is one of the most significant aquatic resources in Arizona, providing municipal and agricultural water supplies and innumerable in-stream benefits for fish, wildlife, and recreation. As a significantly sized, ecologically intact, direct tributary to the Gila River, the 134 acres of Ripsey Wash that would be eliminated by the proposed TSF also constitute ARNI. Ripsey Wash is located at the lower-end of an undisturbed watershed comprised of 15.5 square miles of unfragmented wildlife habitat, and provides outstanding individual and cumulative support to the chemical, physical and biological integrity of the Gila River's aquatic ecosystem. Protection of these resources is an explicit priority of local, state, and federal agencies, environmental organizations, and the public.

Beginning in western New Mexico, the Gila River flows west from the Continental Divide of North America, across three of the four deserts of the United States. It winds through 600 stream miles of Arizona, discharging into the Colorado River that forms the state border with California. The Gila River

watershed covers approximately 57,950 square miles and includes the major metropolitan areas of Phoenix and Tucson, Arizona. The water and riparian habitat resources provided by the Gila River are increasingly valuable for human uses such as water supply, irrigation, and recreation as well as wildlife habitat.

The Gila River is critical to Arizona's economy and the public health of its citizens. Designated Uses for the Gila River, established by Arizona Department of Environmental Quality (ADEQ), include aquatic and wildlife habitat, fish consumption, agricultural irrigation, water for livestock, swimming and non-swimming water recreation. The Gila River watershed supplies a substantial portion of Arizona's surface water for agricultural, industrial, and municipal uses. Water use data<sup>1</sup> indicate that the Gila River hydrologic units provide approximately 35% of total surface water withdrawals for all water uses in Arizona and 37% of the surface water withdrawals used for irrigation.

The Gila River riparian corridor provides increasingly rare and important water, shelter, nesting, and food resources for fish and wildlife in the Southwest. Suburban and agricultural development have led to the removal of more than 90% of the desert riparian habitat in the western United States<sup>2</sup> making the remnants ever more important for plants and wildlife. The perennial and intermittent reaches of the upper Gila River support diverse array of plants and animals, and some of the highest concentrations of breeding birds in North America. The middle Gila River segment supports important wetland resources near the City of Phoenix and provides suitable habitat for many threatened and endangered species. The lower Gila River near the confluence with the Colorado provides important aquatic and wetland habitat for waterfowl and upland avian species, including nesting habitat for the Yuma clapper rail.

Agencies and non-governmental organizations (NGOs) have assembled a mosaic of public and private conservation lands to protect the important natural resources of the Gila River and its surrounding watershed. More specifically, in the upper Gila River watershed, NGOs have helped safeguard ~1.9 million acres of land surrounding the Gila River including the Gila-Mimbres Headwaters and the Gila Riparian Preserve. In the middle and lower stretches of the Gila River, significant conservation work is also underway. The Gila River Indian Community is actively protecting and restoring wetlands and riparian habitat at the confluence of the Salt and the Gila Rivers<sup>3</sup>. The City of Phoenix along with federal and state partners launched the Tres Rios project at the confluence of the Gila, Agua Fria, and Salt Rivers to test the ability of constructed 11-acres of wetlands which will eventually grow to 1,500 acres of habitat in order to treat waste water effluent for the growing metropolitan area of Phoenix.

Direct tributaries of the middle and lower Gila, such as Ripsey Wash and its unfragmented headwaters, provide a range of functions critical to aquatic ecosystem health and stability. These tributaries provide hydrologic connectivity within the watershed, facilitating the movement of water, sediment, nutrients, wildlife, and plant propagules. Ephemeral and intermittent streams are responsible for a large portion of basin ground-water recharge in arid and semi-arid regions through channel infiltration. These ephemeral systems, especially large wide channels, such as those present at Ripsey Wash, drain undisturbed directly from the headwaters in the upper watershed and contribute significantly to the biogeochemical functions of waters within their watershed. The large ephemeral drainages at Ripsey Wash are capable of storing, cycling, transforming and transporting water, elements and compounds, while facilitating the movement of sediment and debris and dissipating energy as part of natural fluvial adjustment.

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<sup>1</sup> <https://water.usgs.gov/lookup/getwatershed?15050100>

<sup>2</sup> McNamee, Gregory (1994) *The Life and Death of an American River*

<sup>3</sup> Gila River Indian Community (2003) *Ecological Conditions of the Gila River Wetlands*. Report to the GRIC Department of Environmental Quality Water Quality Program

### **III. CWA Compliance**

The purpose of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of waters of the United States. These goals are achieved, in part, by prohibiting discharges of dredged or fill material that would result in avoidable or significant adverse impacts on the aquatic environment pursuant to EPA's Section 404(b)(1) Guidelines (Guidelines). Fundamental to the Guidelines is the principle that dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that there is no less environmentally damaging practicable alternative (LEDPA) that achieves an applicant's project purpose (40 CFR 230.10(a)). The Guidelines also require compliance with three additional, independent tests:

- **Protecting Water Quality and Sensitive Species:** Section 230.10(b) prohibits discharges that will result in a violation of water quality standards or toxic effluent standards, jeopardize a threatened or endangered species, or violate requirements imposed to protect a marine sanctuary.
- **Significant Degradation:** Section 230.10(c) prohibits discharges that will cause or contribute to significant degradation of waters. Significant degradation may include individual or cumulative impacts to human health and welfare; fish and wildlife; ecosystem diversity, productivity and stability, and recreational aesthetic or economic values.
- **Mitigation:** Section 230.10(d) prohibits discharges unless all appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

#### **Alternatives Analysis – 40 CFR 230.10(a)**

According to the DEIS, "Asarco's basic project purpose is mine tailings disposal, which is not water-dependent. The Project's purpose is the development of tailings disposal capacity that will allow the full utilization of the mineral resource at the Ray Mine, using infrastructure and processes already in existence at the mine." Given existing remaining capacity, construction needs, and the estimated 50-year planning horizon, the DEIS concludes that approximately 550 million dry tons of new tailings storage capacity are needed based on current projections of ore resources. However, the DEIS also states, "In order to allow for possible additional resources identified in the future, and to account for starter dam or embankment construction, the Applicant has estimated for the purposes of this analysis that the new TSF may need to accommodate an additional roughly 200 million dry tons of material, for a total capacity of roughly 750 million tons." (DEIS pg 1-4)

Neither the DEIS nor the 404 Alternatives Analysis justify the stated need for 200 million tons (approximately 35 percent) of additional storage capacity for unidentified future resources, for a total of 750 million tons. Table 2-1 of the DEIS indicates that 5.2 million tons of rock material are needed for the starter dam embankments. Without an increase in mineral resources projected, the additional 195 million tons of tailings capacity would, in effect, allow for an additional 12 years of storage beyond the 50 years of presently identified storage need. As such, TSF sites significantly smaller than 750 million

tons may satisfy the project purpose; the DEIS does not rigorously explore or objectively evaluate all reasonable alternatives. As recommended in EPA's scoping and ADEIS comments, consideration should be given to the analysis of all alternative designs and methods, including smaller tailings storage facilities and a combination of smaller and larger facilities.

Based on the information provided, the appropriate project purpose to drive alternatives analysis under the Guidelines is to accommodate approximately 550 million tons, the balance of tailings that is to be milled at the Ray Mine over the next 50 years and cannot be accommodated by the existing TSFs. From this project purpose, identification of the LEDPA is achieved by performing an alternatives analysis that estimates the direct, secondary, and cumulative impacts to jurisdictional waters resulting from each alternative considered. Project alternatives that are not practicable and do not meet the project purpose are eliminated. The LEDPA is the remaining alternative with the fewest impacts to aquatic resources, so long as it does not have other significant adverse environmental consequences.

Although the applicant identified six alternatives, only two (the proposed action, Ripsey Wash, and the Hackberry Gulch alternative) were considered practicable. "Practicable" is defined by regulation as alternatives that meet the project purpose and are "available and capable of being done in light of costs, logistics and existing technology." EPA believes neither the DEIS nor the PN provide sufficient information to justify elimination of several alternatives as impracticable, particularly the West Dam and Granite Mountain alternatives. In addition to the capacity inflation discussed above, EPA believes the methods of dry stacking and in-pit storage may be practicable alternatives at any selected site that could reduce impacts and should be further evaluated.

#### West Dam

The West Dam alternative has the capacity to store 757.6 million tons of tailings, but was not evaluated in the EIS due to purported cost and logistics concerns. The West Dam alternative is located to the west of the Ray Mine, with the Dripping Springs Mountain and Mineral Creek located to its east and several buttes and canyons, including Granite Mountain on its west. The site straddles about 2 miles of State Route 177. The small watershed above the West Dam alternative is approximately 469 acres (0.73 square miles), extending to the Granite Mountain ridge line. Total surface disturbance is reported at 1,620 acres with 55.69 acres of direct impacts to waters of the US. Compared to the applicant's proposed alternative, West Dam has a 37% smaller footprint and nearly 60% less impact to waters. Based on this information, the West Dam alternative may be less environmentally damaging and meet the project purpose.

Asarco states that a portion of the West Dam footprint is currently used as rock deposition and leaching areas and that the construction of this alternative would require the relocation of State Route 177, which will cost an estimated \$48 million. Although this is a substantial cost, an alternative cannot be eliminated from further analysis simply because it may be more expensive than the applicant's proposed alternative. Rather, if an alternative is rejected due to costs, it must be credibly demonstrated that the costs are unreasonably higher than a typical applicant could be asked to bear in that situation (i.e., the applicant's proposed alternative is not the cost "baseline" against which alternatives are measured for practicability). Furthermore, if an alternative is to be eliminated based on logistics, it must be demonstrated that there are no viable design options that would allow for the current operation to remain while making slight modifications to the location of the new facility.

In order to make a financially meaningful, relatively comparable distinction between the alternatives, Asarco must also provide costs associated with each alternative. Although the \$48 million cost associated with this site for the highway is a cost the other alternatives may not have, those other alternatives may have their own unique expenses, and thus the proper comparison is to the cost of the alternative over all. Full-cost accounting should be submitted for all alternatives including, but not limited to, purchasing and obtaining permits on land that are privately vs. publicly owned, re-routing all roads such as State Route 177 and Florence-Kelvin Highway, construction of bridges, pipelines, and other infrastructure, relocation of power lines, compensating for mitigation to offset unavoidable impacts, transporting tailings and other material, accounting for reclamation and post-closure management, etc. EPA recommends that the Corps obtain this critical information to support a more defensible determination on whether the \$48 million expense renders this alternative impracticable as a matter of costs.

#### Granite Mountain

The Granite Mountain alternative was also eliminated prior to development of the EIS, yet has the capacity to store 766.7 million tons of tailings. This alternative was identified as impracticable due to the presence of known mineral resources. However, the Mineral Estate and/or Surface and Mineral Estate associated with parcels identified in the 1999 Ray Land Exchange FEIS as CB-2, CB-3, CB-4, and CB-5 are depicted in the land exchange maps as “Production Operation and Support,” “Buffer,” and/or “Transition” areas. The site is located in mountainous terrain to the west of the Ray Mine, with Walnut Canyon immediately northwest of the site, Copper Butte immediately southwest of it, and the Gila River about 2 miles southwest. The small watershed above the Granite Mountain is about 531 acres (pg 11 AMEC Tailings Impoundment Alternatives Technical Memorandum).

The 1999 FEIS identifies only the southeast corner of parcel CB-1 as a “Long Range Prospect.” The Granite Mountain tailings site does not overlap the CB-1 Long Range Prospect area; therefore, location of a TSF here does not appear to conflict with the mineral resource in CB-1. It is unclear that future plans for use of the Copper Butte parcels for other operations/support activities would render them impracticable from a CWA 404(b)(1) standpoint. To assess the viability of the Granite Mountain site for the proposed TSF, more detailed information is needed regarding Asarco’s mineral rights and resources here, both currently under BLM management and after a possible land exchange under private ownership. EPA recommends that the Corps require a map delineating all lode and mill site claims, and more detailed information regarding Asarco’s plans in the Copper Butte parcels under proposed BLM land exchange.

#### Dry Stack Storage

Dry stack tailings storage has been described as impracticable, primarily due to increased infrastructure costs. Dry stacking involves placement of compacted unsaturated dense tailings requiring no dam for water or slurried tailings retention and generally a smaller footprint for storage than traditional slurry facilities. In order to eliminate dry stacking from further analysis, full cost accounting similar to that required of West Dam should be required. In addition, an estimate of impact reduction that is possible at each site under dry stacking practices should be disclosed.

#### In-Pit Placement and Storage

In-pit tailings storage makes use of previously-disturbed mine areas for the storage of tailings. This practice is dismissed from further consideration by Asarco because it would preclude ongoing mining. However, no consideration is provided for use of areas where it can be confirmed, over time, that mineral resources have been fully exhausted. This may prove to be a practicable alternative for a

supplemental, smaller TSF, which would help meet project purposes in a less damaging way, if specific mined out areas of the pit would become available at a later time during mine life. EPA recommends that this alternative be given serious consideration as a component of other alternatives that involve reducing the size of other TSF options to avoid resource impacts. Based on known resources and reserves, Asarco could identify areas of the Ray pit that may be useful a few decades from now, which could provide future in-pit storage capacity. Additional information is needed regarding such areas, including their potential sizes and timing of availability.

The above eliminated alternatives notwithstanding, the Corps' current analysis in the DEIS identifies both the proposed action and the Hackberry alternative as practicable and meeting the project purpose. Because direct fill impacts at Ripsey Wash are estimated at 134 acres of waters, as opposed to 71.5 acres at Hackberry, Ripsey Wash cannot be permitted unless the fill associated with Hackberry can be shown to have "other significant environmental consequences" consistent with 40 CFR 230.10(a).

#### Ripsey Wash, Asarco's Preferred Alternative

The Ripsey Wash alternative is described as primarily a broad channel with loose alluvium soil capable of reducing flow intensities through infiltration and evaporation. The wash is located at the northern end of the Tortilla Mountains, at the lower-end of an undisturbed watershed comprised of 15.5 square miles (Alternatives Analysis, Appendix A pg 18) and draining directly into the Gila River located 0.3 miles downstream. According to the PN, the total project disturbance is estimated at 2,574 acres (Alternatives Analysis Table 9). Total direct fill into waters of the U.S. is 130 acres, half of which are large ephemeral streams that transport high volumes of water, sediment and organic matter into the Gila River. This alternative would also result in indirect loss of an additional four acres of waters of the U.S.

#### Hackberry Gulch

The Hackberry Gulch alternative is located down-gradient from the mine, adjacent to the existing tailings facility of Elder Gulch on the western side of the Dripping Springs Mountains. Its total footprint is estimated at about 2,290 acres. Total direct fill into waters of the U.S. is approximately 51.7 acres, of which 0.62 acres are wetlands. This alternative would also result in indirect loss of an additional 19.8 acres of waters of the U.S. The watershed above the wash supports 4.9 square miles and its relatively confined ephemeral channels are disrupted by State Route 177 and Copper Basin Railway before draining into the Gila River 0.4 miles downstream.

Asarco considers the presence of 0.62 acres of wetlands within the Hackberry footprint as a primary regulatory obstacle. However, Asarco has not demonstrated that the fill of these wetlands and the remaining 71.5 acres of waters is more environmentally damaging than the 134 acres of waters at Ripsey Wash. Despite EPA's repeated requests for wetland functional assessment information that might support the relative importance of these small wetlands, no technical rationale has been provided. During EPA's February 9, 2016 field visit to the site, the applicant did not permit EPA to view the wetlands in question.

Asarco also claims that the presence of fault lines and difficulties with seepage control at Hackberry make this site more challenging to build. Based on maps in the DEIS, however, the fault zone and wetlands appear to be located in the periphery of the Hackberry alternative site and might be practicably avoided based on an appropriate 550 million ton storage need and/or dry stack or other reasonable operational changes. Ultimately, in order to eliminate this alternative as the LEDPA, Asarco must demonstrate that this alternative is either more environmentally damaging or is impracticable of being

built, neither of which is reflected in the current record. Based on the information presented in the AA and DEIS, Hackberry is a less environmentally damaging alternative compared to Ripsey, and does not clearly present any “other significant environmental consequences” if the TSF is designed and managed properly.

### **Water Quality - 40 CFR 230.10(b)**

The Guidelines prohibit any discharge of dredged or fill material if it causes or contributes to violations of an applicable state water quality standard. Elimination of a substantial portion of the contributing subwatershed at Ripsey Wash will result in reductions in streamflow, alterations in sediment transport, and chemical leaching that will degrade water quality and the aquatic ecosystem. In addition, the proximity of the proposed facility to the Gila River poses substantial risk to water quality if facility containment should fail.

The potential environmental impacts of construction, operation, closure, and post-closure management of the proposed Ray TSF are of serious concern because the TSF, as proposed, could result in significant impacts to Gila River water quality. Experience has shown that a TSF, as designed, will likely need to be actively managed far into the future beyond closure. Representative geochemistry and hydrogeologic information is critical to inform the appropriate design and operation and management needs of a TSF to ensure that it is protective of groundwater and surface water resources. This information is also needed, along with temporary shutdown, closure, and post-closure management plans to estimate the true costs of the project and the long-term financial obligations that the applicant will need to satisfy to ensure protection of these resources.

The amount and type of financial assurance required of the applicant could make the difference between the project being sufficiently managed over the long-term by the site operator, versus an unfunded or under-funded contaminated site that becomes a liability for the government and taxpayers. The financial assurance proposed in the draft APP will not be adequate to satisfy closure and post-closure obligations, creating a substantial, persistent, and unnecessary risk to water quality.

### **Significant Degradation – 40 CFR 230.10(c)**

Impacts from the proposed project will cause significant degradation of Ripsey Wash and contribute to significant degradation of the Gila River. This risk of significant degradation is based on:

1. The relatively large size of the Ripsey Wash contributing watershed and its associated flows;
2. The large proportion of the natural Ripsey Wash watershed that will be permanently altered or eliminated by the proposed alternative;
3. The major disruption of the ecological connectivity between the Ripsey Wash drainage network and the affected reach of the Gila River;
4. The desynchronization of natural flow from Ripsey Wash into the affected stream reach, and associated disruption of sediment delivery and transport;
5. The degradation of aquatic life from modification of the physical structure and water quality of the affected stream reach;
6. The cumulative contribution to the significant degradation of the Gila River, and the impact on human welfare based on the ecological services derived from the river;

7. The high degree of difficulty to mitigate or otherwise offset the adverse impacts described above; and
8. The potential reversal of functional improvements that have been cumulatively achieved through numerous upstream restoration and preservation efforts.

Operation of the proposed TSF, as designed, would increase pollutants from the tailings impoundment into the Gila River. Conservation and restoration objectives on the Gila River would be hampered by increased fragmentation of the landscape and riparian corridor. Alone or in combination, the changes brought on by the proposed project are significant, adverse impacts under the Guidelines.

### **Mitigation – 40 CFR 230.10(d)**

No discharge or dredged or fill material shall be permitted unless appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem. For unavoidable impacts that remain, a permit applicant is required to comply with the “Final Rule for Compensatory Mitigation for Losses of Aquatic Resources” (40 CFR Part 230 Subpart J). As described in the PN and the Corps’ DEIS, the Asarco Ray Mine TSF meets neither of these standards.

With regard to “appropriate and practicable steps” to minimize impacts, EPA believes providing industry-standard level and specificity of financial assurance is both appropriate and practicable. Extensive experience with mines and tailings facilities provides the government with ample evidence of the risk of failure and environmental consequences, and the need for closure and post-closure monitoring and management. Remarkably, Asarco has provided no such closure or long-term management plans, and has offered a corporate bond of inadequate funding for assurance.

Until the applicant addresses the practicable impact avoidance measures discussed above, it would be premature to discuss in-depth the conceptual compensatory mitigation plan for the proposed project at Ripsey Wash. Much work remains to be done toward meeting the LEDPA standard for the proposed project. However, the proposed compensatory mitigation for project impacts is inadequate for replacing functions and services that would be eliminated by the proposed project at Ripsey Wash. The applicant has not properly analyzed how the compensatory mitigation actions described in the plan will replace functions and acreage that would be lost to the proposed project.

To assess the functional condition of aquatic resources on the proposed project site as well as the proposed mitigation lands, the applicant commissioned a project-specific qualitative functional assessment.<sup>4</sup> Their consultant’s work product grouped streams into three classes based on channel width. Ripsey Wash drainages and mitigation sites were then scored qualitatively using a list of 11 hydrologic, chemical and biotic functions developed for each drainage class.<sup>5</sup> Although valid and relevant fluvial functions were identified, they were subjectively rated on a scale from “0” (non-functional condition) to “5” (highly functional system).

This work product does not provide meaningful assessment of the functions of riverine systems across the proposed project and mitigation sites because it penalizes aquatic resources for “failing” to provide

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<sup>4</sup> *Ripsey Wash Tailings Storage Facility Functional Assessment of Impacted Waters and Proposed Mitigation Sites ASARCO LLC (RWFA)*, prepared by Westland Resources, Inc. dated November 5, 2015.

<sup>5</sup> RWFA, p. 5.

functions they did not naturally evolve to provide. A more scientifically valid assessment recognizes that some waters may perform certain functions better than others due to differences specific to their landscape context, rather than due to impairment. In other words, a valid assessment does not classify ephemeral systems as inherently “lower functioning” than intermittent or perennial systems that evolved in a completely different climatological and physiographic setting.

Similarly, the chemical, physical, and biological functions of a network of higher-order or headwater streams cannot be meaningfully “replaced” by a large single channel, even if that channel is found to pass similar levels of flow and sediment in the aggregate. Yet “assessments,” such as this one, routinely “score” aquatic resources in this way for purposes of calculating mitigation requirements. For example, comparison of the functions of 1<sup>st</sup> order ephemeral riverine waters against those of 5<sup>th</sup> order perennial waters, as the applicant’s assessment does for computing scores, is not ecologically meaningful. Although nearly pristine, the Ripsey Wash headwater streams received a low score (“1”) for sediment transport/regulation in comparison to a high score (“5”) at the Gila River Mitigation Site, despite the fact that both provide sediment transport functions appropriate to their given classes.<sup>6</sup>

Although some functions overlap significantly between hydrologic classes, they are performed through the combination of slightly different processes and at different levels or intensities. A more appropriate assessment would allow a relative, rather than an absolute scale, and provide better resolution of expected functions as well as a regional standard for comparison.<sup>7</sup> For example, within the context of a regional reference framework, the 1<sup>st</sup> through 3<sup>rd</sup> order ephemeral streams on the Ripsey Wash impact site would likely score as high-functioning, because the upper watershed stressors in this context are minimal. Compounding this error, the assessment scores some waters based on functions that are not reasonably expected to be present in even a pristine, natural feature of this type; headwater streams (Ephemeral Class 3) are scored zero for the “Presence of Fish and Fish Habitat Structure.” A natural consequence of these distortions is to bias a total numeric score toward perennial systems, rather than the actual, high functioning arid aquatic ecosystem being impacted.

The “functional assessment” assigning relative value of the services provided by the Ripsey Wash is not based on any existing or approved condition or functional assessment method. Its subjectivity and simplicity are inadequate to compare natural functions with those services provided by the proposed compensatory mitigation. EPA does not agree with the assumptions made to evaluate the functional condition of the Ripsey Wash and subsequent “scoring” of this site as well as the mitigation sites; nor with comparisons made between the intrinsic values of these two very different systems, desert streams at Ripsey vs. riparian habitats at the mitigation sites.

According to the 2008 Mitigation Rule, compensatory mitigation must be, to the extent practicable, sufficient to replace lost aquatic resource functions. If a functional or conditional assessment, or other suitable metric is not used, a minimum one-to-one acreage or linear foot compensation ratio must be used. EPA recommends that the Corps require a ratio greater than one-to-one where necessary to account for the method of compensatory mitigation (*e.g.*, preservation), the likelihood of success, differences between the functions lost at the impact site and the functions expected to be produced by the compensatory mitigation project, temporal losses of aquatic resource functions, the difficulty of

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<sup>6</sup> RWFA, p. 11. The disparity of scores was further intensified by categorizing the ephemeral waters at Ripsey Wash into “classes” based on channel width. “Ephemeral Class 3” waters are scored the lowest yet are high functioning headwater streams supporting downstream waters.

<sup>7</sup> Reference sites are the observed and measured characteristics of a range of similar sites within a regional or study area.

restoring or establishing the desired aquatic resource type and functions, and/or the distance between the affected aquatic resources and the compensation site (CFR 230.93(f)).

In sum, the assessment provided does not satisfy the requirements of a suitable assessment method to assess the loss of aquatic function (33 CFR 332.3 (f)(1)). A lack of understanding of how these riverine systems are connected and function, and the use of inappropriate functional criteria, have produced total numeric scores that significantly underestimate the functions of waters at Ripsey Wash and inappropriately compare these scores to the mitigation sites proposed.

Consistent with national “no net loss” goals codified in the Rule, and with the Corps’ South Pacific Division standard operating procedures for setting mitigation ratios, the proposal submitted offers insufficient “in-kind” re-establishment mitigation opportunity to offset permanent impacts to 134 acres of ephemeral streams. This significant compensatory burden would be considerably reduced under a less impactful alternative that involves filling significantly fewer acres than the Ripsey alternative. However, even with reduced mitigation need, Asarco’s current plan focuses primarily on preservation of riparian habitat and removal of invasive species. Preservation of existing waters should only be accepted when the aquatic resources to be preserved are of substantial ecological value, are at significant risk of loss if not preserved, and will be preserved in complement to other reestablishment and rehabilitation efforts. None of these criteria are adequately demonstrated in this case.